able intensity was in existence over southern Samar, the observations from Borongan giving this impression. Future study of more complete observations is necessary to confirm this idea.

The severe intensity of this typhoon could be understood from a 24-hour pressure fall of 4 mm. (0.1575 in.) at Yap, December 3 to 4, together with east winds of velocities between 50 and 80 kilometers per hour over Guam, as the storm center passed south of the island. These high velocities persisted until the typhoon was about 500 miles away from San Bernardino Strait. Aerological stations over the Philippines did not have winds of any strength until December 8, when the storm center was over the Archipelago. It must be remembered that the depression over the Sulu Sea influenced the upper winds until December 5. But velocities over 55 kilometers per hour were not reported until December 8, the strongest values being at Manila and Dagupan, the latter station reporting values up to 100 kilometers per hour, directions being from east and southeast quadrants.

Depression, December 12–18, 1938.—A low pressure area appeared over the western Caroline Islands, moved west-northwest and west toward the Philippine Archipelago, manifesting the strength of a depression after December 14. The center passed over the regions neighboring Surigao Strait, then inclined somewhat to the west-southwest and disappeared over the Sulu Sea. The upper winds reported while this disturbance was in existence indicated that the trade wind alone was acting. The weather situation was such that little, if any, air was coming from the northern regions, while the few reports received from Malaya and Java stations showed that the Southwest Monsoon current was weak. On the other hand, Guam had east and east-southeast winds with velocities up to 50 kilometers per hour and higher during these days.

Depression, December 21–22, 1938.—An extended, persistent trough of low pressure over the China Sea, Formosa and the regions adjacent to the Nansei (Loochoo) Islands finally developed into a maritime northern depression of some strength on December 21. This center appeared rather close to and east of the Nansei Islands, and then moved rapidly northeast and east beyond the regions of observation.

WATERSPOUT OF OCTOBER 29, 1938, IN THE MEDITERRANEAN SEA

The annexed illustrations of a waterspout were reproduced from sketches sent to the Marine Division by Third Officer J. Meinsma of the Dutch Steamship *Soekaboemi*, Capt. H. D. Braspot, while in the Mediterranean Sea on October 29, 1938. Although the waterspout appears to have been imperfectly developed, as its trunk did not span the entire distance between the cloud and the sea, Mr. Meinsma's drawings show three phases of the spout's existence finely delineated. The ship at time of the first observation was near 36° north latitude, 17½° east longitude. The time was 08:05 M. T. G. The subsequent drawings show the phenomenon at 08:15 and 08:20, at which latter time what remained of the trunk is shown as a wide flattened projection extending only a short distance from the cloud base. The height of the cloud base according to Mr. Meinsma, "was about 1,200 feet above the horizon. At the left side it was raining."

The accompanying weather was: "Cloudy, with sunshine; barometer 759.6 (corrected); air temperature 20.2° C.; water temperature 20.0° C.; wind west-northwest, force 3; sea and swell, west-northwest, 2."—*W. E. Hurd.*

SEA-SURFACE TEMPERATURE SUMMARY FOR WATERS OFF THE COAST OF NORTHWESTERN UNITED STATES AND SOUTHERN VANCOUVER. 1912–29

By GILES SLOCUM

The area embraced in this summary comprises, as shown on figure 1, one 5°-square, from 40° to 45° N., and from 125° to 130° W., and parts of two 5°-squares along the coast between 40° and 50° N.

Normal temperatures for each month and for the year are shown in table 1 for each of the areas. The annual range of surface temperature here is rather small for the latitude, and is in marked contrast with the range[1] on

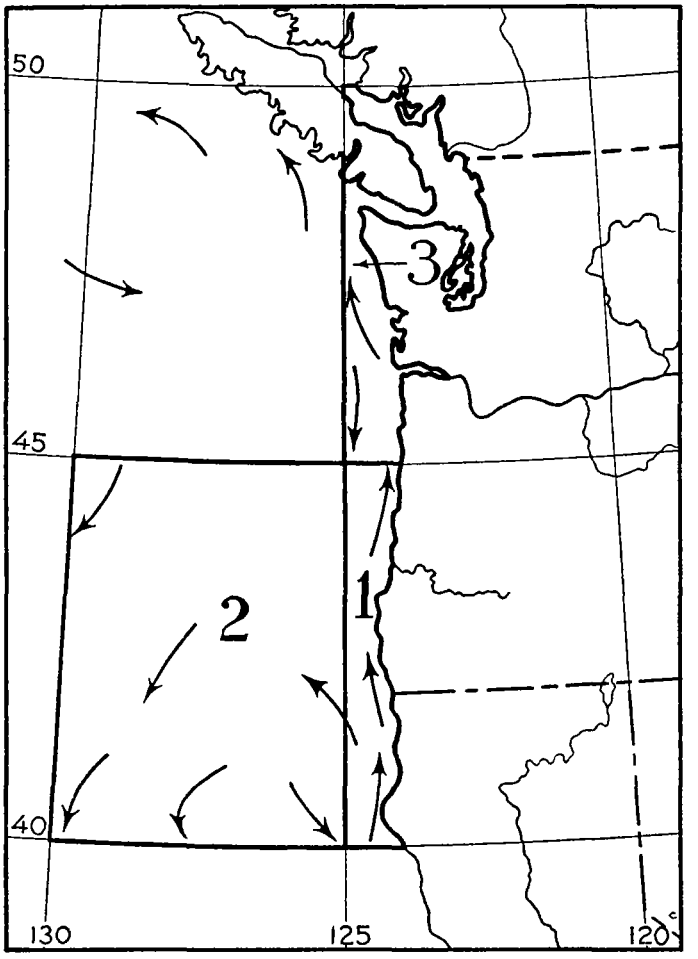

FIG. 1.—Chart identifying area numbers listed in table 1. Arrows show set of surface water currents.

the east coast of the United States at the same distance north, where the summer to winter temperature drop is in excess of 20° F., and close to the coast exceeds 30°.

Observations are not numerous in these three areas, as can be seen by reference to table 2. Compilation of a satisfactory temperature history for each area is therefore impossible because the number of observations per month is insufficient to indicate significantly the uniformly small temperature departures which obtain. The three areas have been combined in this paper to provide what is even then a practically irreducible minimum of observations for each month of the period covered, 1912 to 1929, inclusive.

[1] Slocum, Giles, The Normal Temperature Distribution of the Surface Water of the Western North Atlantic Ocean, MONTHLY WEATHER REVIEW, Vol. 66, pp. 39-43.

TABLE 1.—*Normal monthly temperatures*

[Areas numbered as in the illustration]

Month	Temperatures		
	Area No. 1	Area No. 2	Area No. 3
	° F.	° F.	° F.
January	50.4	50.5	46.2
February	50.2	50.5	45.8
March	49.2	49.7	46.0
April	49.8	50.6	47.9
May	51.7	52.7	50.7
June	53.2	55.3	53.3
July	54.3	58.4	56.2
August	55.0	60.7	56.0
September	55.7	61.0	55.1
October	54.3	57.9	52.8
November	52.7	55.8	50.3
December	51.3	53.4	47.9
Annual	52.3	54.7	50.7

Sampling indicates that the temperatures in these three areas fluctuate together fairly closely about their normals, but reference to table 1 shows that the seasonal marches of the normal temperature for the respective areas are not mutually homogeneous. The northern area is considerably cooler than the two southern areas, and the range in temperature is considerably larger in the coastal strip of these two southern areas. It has been impossible, therefore, to express the temperature history for the complete area in terms of actual temperatures, since the area as a whole has no normal temperature expressible as a single value. The most satisfactory solution of the dilemma involved seems to be to show only the departures from normal surface temperature, computed as follows:

For each month of the 18 years, the monthly normal temperature for the area in which each individual observation was found was subtracted from the observed temperature, and the average departure from normal for all the observations for the month was computed by dividing the total number of observations into the sum of the remainders.

Normal temperatures used are 20-year values, including 1930 and 1931 observations. The small number of observations for these 2 years made it impossible to compile satisfactory monthly temperature histories later than 1929. Temperature departures for 1930 and 1931 were generally above normal, except for possibly the final third of 1931. The computed departures for 1930, based on 78 observations combined for the three areas, was +0.8°; and for 1931, based on 22 observations, was + 0.5°.

This is the thirteenth of a series of sea-surface temperature history tabulations for small oceanic areas near to the North American continent, but is the first covering west coast data. The first of the series of compilations appeared in the November 1934 issue of the MONTHLY WEATHER REVIEW, and the last previous tabulation appeared in the October 1938 issue.

TABLE 2.—*Monthly and annual mean sea-surface temperature departures from normal off the northwestern coasts of the United States, 1912 to 1929, inclusive*

Year	Total number of observations	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1912	260	−1.8	−0.1	−0.2	−1.5	+1.4	+0.7	+1.3	+2.4	+0.3	−2.1	−0.8	−1.9	−0.2
1913	340	−0.9	−3.7	−1.8	−2.0	−1.2	+2.6	+2.1	+0.5	+0.2	−0.7	−0.6	−0.4	−0.5
1914	161	−0.1	−2.2	+1.9	+1.4	+0.2	+0.6	−1.4	−0.7	−1.0	+1.5	+1.6	+1.4	+0.3
1915	272	+0.6	+3.0	−0.3	+2.1	−0.1	−0.1	−1.2	+0.8	+1.3	−0.3	−0.2	+0.1	+0.5
1916	230	−2.9	−0.8	+0.7	+1.0	−0.5	−1.0	−0.8	+2.0	+0.1	−2.6	−3.1	−2.5	−0.9
1917	307	−1.7	−1.4	−1.6	−1.8	−0.9	−0.6	−1.3	−1.8	+0.7	−1.7	+1.0	+2.7	−0.7
1918	286	+2.6	+1.2	−0.1	+0.1	−0.7	−2.1	−2.5	+0.5	−1.0	0.0	+0.5	−0.2	−0.1
1919	233	+0.2	+0.5	+0.2	+0.9	−0.4	−3.3	−3.5	−1.4	−0.3	−1.9	−1.7	−2.0	−1.1
1920	324	−1.8	−0.3	−0.1	−1.3	−1.7	−1.0	+1.3	−2.6	−1.8	+0.6	−0.4	+0.3	−0.7
1921	218	−0.3	+0.3	−0.6	0.0	−1.2	+1.7	−3.9	−2.5	+0.5	+0.8	+1.4	−0.6	−0.4
1922	187	−0.8	−3.4	−0.7	−2.7	−2.0	+1.2	−1.5	−0.2	−0.1	+3.2	−2.1	−0.2	−0.8
1923	240	−0.1	−0.8	−1.7	−1.7	+0.3	+0.2	+1.9	+2.6	+2.4	+2.2	+1.9	+0.2	+0.6
1924	375	−0.3	+1.6	+0.2	+0.1	−0.4	+0.2	−1.1	+0.6	−2.0	−0.1	+0.4	−1.0	−0.2
1925	266	−0.6	−0.5	+2.7	+0.8	+0.6	+0.7	+1.2	+0.5	+1.2	+0.1	−2.4	+2.0	+0.5
1926	330	+2.8	+3.2	+3.6	+4.2	+4.6	+1.9	+1.2	+2.5	+2.5	+2.8	+2.2	+1.5	+2.8
1927	217	+2.3	+0.5	+1.5	+0.4	+0.2	−1.4	+0.9	+0.6	+1.3	+1.4	+1.8	−1.2	+0.7
1928	215	+1.2	+1.1	+0.2	−0.2	+1.4	+1.9	+1.0	+1.5	−2.0	−1.1	+1.0	+2.5	+0.7
1929	257	+0.4	−1.1	−0.1	−0.1	+2.2	+1.7	+1.1	−0.7	−1.1	−0.5	+0.3	+0.6	+0.2